

Claims

[c1] 1. A double-side image scanner module suitable for scanning a document having a first side and an opposing second side, comprising:
a paper feeder, further comprising:
a paper-feeding through-channel, through which the document is transmitted,
the paper-feeding through channel further comprising:
a first-side scanning region for scanning the first side of the document;
a second-side scanning region, aligned with the first-side scanning region for scan the second side of the document; and
a paper-turning region, between the first-side scanning region and the second-side scanning region, through which the document is turned up side down; and
a plurality of document transmission members along the paper-feeding through-channel for transmitting the document; and
one image extraction apparatus, aligned with both the first- and second-side scanning regions to extract images of the first and second sides of the document through the first- and second-side scanning regions, respectively.

[c2] 2. The double-side image scanner module according to claim 1, further comprising a light transparent channel from both the first- and the second-side scanning regions to the image extraction apparatus allowing light to travel between the image extraction apparatus and the first and second sides of the documents located at the first- and second-side scanning regions, respectively.

[c3] 3. The double-side image scanner module according to claim 2, wherein the image extraction apparatus can be driven to enter the light transparent channel immediately under the first-side scanning region for scanning the first side, and immediately under the second-side scanning region for scanning the second side.

[c4] 4. The double-side image scanner module according to claim 1, wherein the image extraction apparatus is moveable to obtain a constant distance to the first-side scanning region and to the second-side scanning region.

[c5] 5. The double-side image scanner module according to claim 1, wherein the distance between the first-side scanning region and the second-side scanning

region is no less than the length of the document.

- [c6] 6. The double-side image scanner module according to claim 1, wherein the paper-turning channel has a length no less than the length of the document.
- [c7] 7. The double-side image scanner module according to claim 1, wherein the image extraction apparatus includes a light source adjustable according to images of the first and second sides of the document.
- [c8] 8. The double-side image scanner according to claim 1, wherein the image extraction apparatus includes an adjustable light source allowing images of both the first and second sides of the document extracted by the image extraction apparatus with identical quality.
- [c9] 9. The double-side image scanner according to claim 1, wherein the document transmission members include a plurality of rollers.
- [c10] 10. The double-side image scanner module according to claim 1, wherein the paper feeder further comprises a first sensor so located that the document entering the first-side scanning region can be detected thereby, and a second sensor so located that the document entering the second-side scanning region can be detected thereby.
- [c11] 11. The double-side image scanner module according to claim 8, wherein the first and second sensors are switched on/off manually to determine which side of the document to be scanned.
- [c12] 12. The double-side image scanner module according to claim 8, wherein the first and second sensors are in electrical or optical communication with the image extraction apparatus, so as to transmit a signal carrying image information of the first and second sides of the document to the image extraction apparatus upon detection thereof.
- [c13] 13. The double-side image scanner module according to claim 10, wherein the image extraction device includes a light source adjustable according to the image information transmitted from the first and second sensor.

[c14] 14. A double-side image scanner module, comprising:
a paper feeder, further comprising:
a first paper-transmission channel, from which a document is fed in with a first side thereof facing downwardly;
a second paper-transmission channel, parallel to the first paper transmission channel, from which the document is discharged with a second side thereof facing downwardly; and
a paper-turning region, connected between the first and second paper-transmission channel to transmit the document from the first paper-transmission channel to the second paper-transmission channel; and
a plurality of transmission members installed along the first paper-transmission channel, the paper-turning region and the second paper-transmission channel for transmitting the document;
an image extraction apparatus, to extract images of the first and second sides of the document; and
a light transparent channel perpendicular to both the first and second paper-transmission channels, extending between the first or the second paper-transmission channel and the image extraction apparatus.

[c15] 15. The double-image scanner according to claim 14, wherein the image extraction apparatus can be driven to enter the light transparent channel immediately under the first-side scanning region for scanning the first side, and immediately under the second-side scanning region for scanning the second side.

[c16] 16. The double-side image scanner module according to claim 14, wherein the image extraction apparatus is moveable to obtain a constant distance to the first-side scanning region and to the second-side scanning region.

[c17] 17. The double-side image scanner according to claim 14, further comprises a plurality of rollers in the paper feeder to transmit the document.

[c18] 18. The double-side image scanner according to claim 14, wherein the paper-turning channel is substantially perpendicular to both the first and the second paper-transmission channels.

[c19] 19. The double-side image scanner according to claim 14, wherein the first paper-transmission channel is positioned above the second paper-transmission channel.

[c20] 20. The double-side image scanner according to claim 14, further comprises a first sensor located at the first paper-transmission channel and a second sensor located at the paper-turning channel for selectively performing single-side scanning between the first and the second sides or double-side scanning thereof.

[c21] 21. The double-side image scanner module according to claim 14, wherein the image extraction apparatus further comprises an adjustable light source allowing the images of the first and second sides of the document extracted thereby to have identical quality.

[c22] 22. The double-side image scanner module according to claim 14, wherein the first paper-transmission channel, the paper-turning channel, and the second paper-transmission channel construct a U-shaped paper-feeding through-channel.

[c23] 23. A scanning method for a double-side image scanner module, suitable for scanning a document having a first side and a second side, comprising:
feeding the document into a paper-feeding through-channel of the double-side image scanner module with the first side facing an image extraction apparatus while passing over a light transparent channel;
scanning the image of the first side by the image extraction apparatus;
transmitting the document along the paper-feeding through-channel until the second side of the document facing the image extraction apparatus while passing over the light transparent channel at a different height; and
scanning the image of the second side by the image extraction apparatus.

[c24] 24. The method according to claim 23, further comprising a step adjusting a light source of the image extraction apparatus before scanning the first side of the document.

[c25] 25. The method according to claim 24, further comprising a step of adjusting a

light source of the image extraction apparatus before scanning the second side of the document.

- [c26] 26. The method according to claim 23, further comprising adjusting the distance between the first side and the image extraction apparatus before scanning the first side.
- [c27] 27. The method according to claim 23, further comprising adjusting the distance between the second side and the image extraction apparatus before scanning the second side.
- [c28] 28. A scanning method for a double-side image scanner module, suitable for scanning a document having a first side and a second side, the double-side image scanner module having a paper feeder and an image extraction apparatus, wherein the paper feeder has a first paper-transmission region, a paper-turning region and a second paper-transmission region allowing the document to travel through in sequence, the method comprising:
 - feeding the document into the first paper-transmission region with the first side facing an image extraction apparatus while passing over a light transparent channel;
 - determining whether the first side is to be scanned;
 - adjusting a light source incident onto the first side when the first side is to be scanned, so as to obtain an image thereof;
 - transmitting the document through the paper-turning region and turning the document with the second side facing the image extraction apparatus while passing over the light transparent channel at a different height;
 - determining whether the second side is to be scanned;
 - adjusting the light source incident onto the second side when the second side is to be scanned, so as to obtain an image of the second side; and
 - discharging the document from the double-side image scanner module.
- [c29] 29. The method according to claim 28, the light source remains unchanged when the first side is not to be scanned.
- [c30] 30. The method according to claim 28, the light source remains unchanged

when the second side is not to be scanned.

[c31] 31. The method according to claim 28, wherein the light source is so adjusted for scanning the first side and the second side that the quality of the images obtained therefrom is identical.

[c32] 32. A scanning method for a double-side image scanner module, suitable for scanning a document having a first side and a second side, the double-side image scanner module having a paper feeder and an image extraction apparatus, wherein the paper feeder has a first paper-transmission region, a paper-turning region and a second paper-transmission region allowing the document to travel through in sequence, the method comprising:
feeding the document into the first paper-transmission region with the first side facing an image extraction apparatus while passing over a light transparent channel;
determining whether the first side is to be scanned;
adjusting a the distance between the image extraction apparatus and the first side when the first side is to be scanned, so as to obtain an image thereof;
transmitting the document through the paper-turning region and turning the document with the second side facing the image extraction apparatus while passing over the light transparent channel at a different height;
determining whether the second side is to be scanned;
adjusting the distance between the image extraction apparatus and the second side when the second side is to be scanned, so as to obtain an image of the second side; and
discharging the document from the double-side image scanner module.

[c33] 33. The method according to claim 32, the distance between the image extraction apparatus and the first side is the same as that between the image extraction apparatus and the second side.

[c34] 34. The method according to claim 33, the distance between from the image extraction apparatus to the first and the second sides are so adjusted to obtain the same image quality from the first and second sides.